

THE
PROPHYLAXIS OF PHTHISIS PULMONALIS

THE
ANNUAL DISSERTATION

READ BEFORE THE

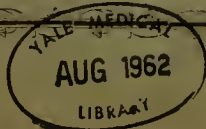
Convention of the Conn. Medical Society,

MAY 24, 1866.

BY CHARLES L. IVES, M. D.

RE-PRINTED FROM THE SOCIETY'S TRANSACTIONS.

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THE PROPHYLAXIS OF PHTHISIS PULMONALIS.

THE report of our State Librarian, for the year 1863, presents a total of 7,470 deaths from ascertained causes, occurring during that period. Of these, 1,131 were from Phthisis Pulmonalis, or Consumption of the Lungs. In 1864, of 8,132 reported deaths, 1,171 were from the same destructive disease. In 1865, of 7,039 deaths, 1,108 were from this cause. In other States, the relative mortality is a like fearful one. And yet, of this vast amount of disease and death, nearly all might have been prevented. Those months and years of suffering, that sad foreboding, that agony of actual parting, that loss to the family of its hope and pride, that loss to society of its present or anticipated ornament and dependence; of this, nearly all might have been saved. Proper watchfulness, care and management, would have warded off the malady in the vast majority of these cases, for there is scarce a disease whose prevention is so much in our power as this.

The symptoms presented by Phthisis Pulmonalis, are too well known to need description here. The peculiar feature of the disease is the presence in the lung of a tubercular deposit, which causes, in general, suppuration, and the destruction of the tissues involved. An important inquiry then meets us at the start. What is tubercle; how and when is it deposited in the lungs?

Two forms of pulmonary tubercle are recognized by pathologists; the grey, miliary tubercle, small, distinct, spherical bodies, of the size of millet seed,—if larger, formed by the aggregation, not coalescence of such bodies,—and the yellow, cheesy tubercle, amorphous and friable, in disseminated masses it may be, or closely packed into the lung, like the inflammatory deposit of pneumonia.

The theory heretofore generally received of the formation of tubercle, regards it as an abnormal exudation from the blood. A tubercular dyscrasia, some peculiar alteration or impairment of the blood or of the vital forces is assumed, in consequence of which the liquor sanguinis, which has been effused from some quasi inflammatory action, instead

of proceeding on in its normal development into healthy formative cells, or into pus, is somehow arrested midway of this process, and the imperfect residuum remains, as tubercle. On this view, tubercle is an abortive development of the plasma of the blood. Of this theory, Dr. J. H. Bennett stands as the recognized exponent.

Another theory, that of Virchow, recognizes an important distinction between the grey and the yellow tubercle. It bestows the name upon the former only, and traces its growth as a distinct, minute tumor, a literal tubercle, from a proliferation or progressive development of cells from a parent cell. It would seem to have been, perhaps, this development of true tubercle, which gave that eminent observer the clue to his great doctrine of cell growth. The yellow, cheesy substance is not properly tubercle, in fact, does not deserve the name, being merely the result of the fatty degeneration and disintegration of other tissues, it might be of the grey (the true) tubercle, of pus, of carcinoma, and the like. Such a radical distinction between the two forms of tubercle, is borne out in our practical experience, by the essential difference in the diseases caused by the two forms. The Acute Phthisis, produced by the grey tubercle, so very marked in its constitutional symptoms as to have originated a suspicion of its identity with typhus fever, is strangely unlike the chronic wasting of the old fashioned Consumption, the Phthisis of the yellow tubercle.

Of Acute Phthisis, of the origin of grey tubercle, we have little to say. We know little, and, fortunately, see but little of it. The Chronic form of Phthisis which, slow but sure, yearly kills its thousands, offers to the physician the fullest and most satisfactory field for prophylactic measures.

What then is the yellow, cheesy material which causes such havoc in the delicate tissue of the lung? A degenerated and degenerating tissue, we say, but whence comes it,—whence its source of supply? From the worn out epithelial cells of the air vesicles, which, having performed their function, instead of being then disintegrated and carried off as usual by the vital actions of the part, are suffered to remain, filling the air vesicles, and by their gradual accumulation, rendering that portion of the lung unfit for respiration. In the so-called "tubercle corpuscle" of Lebert, we find the large nucleus of the epithelial cells, while the accompanying granular matter is made up of the broken down substance of the same cells. This theory of the epithelial origin of the common tubercle,—common, in its greater frequency, and yet, after all, really a simulated or spurious tubercle,—this theory, it will be found, explains many problems which the exudation

theory fails to meet. That theory, as Dr. Edward Smith has well shown, assigns no satisfactory reason for the arrested development of the exudation, especially in an organ so highly vitalized as the lung, at a time when exudation goes on to its normal development, in case of inflammatory action elsewhere. It offers no reason why the exudation of yellow tubercle should be found so uniformly in the upper part, the very apex of the lung, or why the disease should especially affect the early years of adult life. Chemical and microscopical tests fail to discover any proof of the dyscrasia, the peculiar alteration of the blood assumed. The observations of that eminent microscopist, Virchow, are utterly irreconcilable with the theory. (Cellular Pathology, Am. edition, page 439.) He "found that a series of tubercular deposits in different organs never at any time exhibited a discernible exudation, but always, during the whole course of their development, presented organized elements, without its being possible to observe either in them, or before they existed, any stage in which amorphous, shapeless matter was present." Further on he tells us, that "nuclei and cells are found in great abundance, though they afterwards break up, and directly supply the material for the final accumulation of cheesy substance."

Turning, then, from the Exudative to the Epithelial theory, we find that the view it gives us of the origin of Chronic Phthisis, is most encouraging. No diseased exudation is to be pre-supposed. The tubercular matter is originally a normal constituent of the part; epithelial cells, which have failed to be excreted from the system, when their work is done, and remain as a foreign body, to be excreted by softening and expectoration, or possibly to be mainly absorbed, after a fatty degeneration, as sometimes occurs with pus cells. But why does this accumulation ever take place? Simply, for the lack of that force which ordinarily operates to prevent it.

What this agency is, it is most important for us to understand. The mucous surfaces of the alimentary canal, cast off the worn out epithelium, by peristaltic action and the friction of passing substances; from the pulmonary bronchi, excretion is carried on by the ciliary currents; but the air vesicles of the lungs, these cul-de-sacs, with scarce an appreciable incoming or outgoing current, without ciliary action, how shall their effete contents be emptied into the capillary bronchus? Perhaps the outward ciliary current may exert some influence, a slight *vis a fronte*, but in the main we must depend upon the mutual pressure of the air vesicles, and their closing or collapsing during expiration, to press out their contents; the completeness

of this action depending upon the depth and vigor of the respiration. With a lessening breath motion, then, there will be, of course, less and less facility of excretion, till at last the epithelial debris begins to accumulate in the well-known form of a tubercular deposit.

Such an accumulation we should expect to find in the apex of the lung, where the more unyielding parietes, ribs, clavicle and scapula, prevent the free movements of the parts, so that no little muscular effort is required to draw the air into the remoter vesicles, to sweep out the dirt, so to speak, from this far corner of the lung. There, in fact, the tubercles are found, and not in the depending and more moveable portion of the lung, where, following the law of gravity, congestion and true inflammatory exudation first make their appearance. The deposit having thus originated in the apex of the lung, the air vesicles first affected, when filled and solid, like an unyielding wall, restrain the motion, and consequently the epithelial excretion of the next adherent vesicles; and so from above downwards, the deposit creeps on, each newly filled vesicle binding down its neighbor beneath, and preparing it for a like total failure of its function. That the deposit is so long restricted to one side of the chest, a fact almost at variance with the theory of a general exudation from the blood, finds a ready explanation on the epithelial theory.

The efforts of the healthy lung to supplement the deficiencies of the other, as evinced by the puerile respiration on the sound side, tend to insure a more complete expansion of that lung, thus preventing a deposit on that side for a long time, or until the increasing prostration of the disorder shall have sufficiently reduced the general respiration, and with it the excreting power of both lungs.

Again, on this view we can readily understand why childhood enjoys an immunity from this disease, which especially attacks the system when the culminating vigor of early manhood might presuppose the greater exemption. In childhood, the forming and shedding of epithelium, the waste and repair of all the tissues, is exceedingly rapid; abundant material is thus at hand for the deposition of tubercle in the lungs. But the energy of the respiratory movement is equally in excess; the child of either sex is ever in motion, and ever in the open air, if possible; he runs, he shouts in his play, and the needs of the circulation requiring large supplies of oxygen, he drinks in deeply of the vital element; every day he *expands his lungs* to the utmost; and, while he does this, he is safe from Pulmonary Phthisis. But with the age of puberty his habits change; the boy is confined in doors, bending over his books at school, or in the hours at

home which should be given to play ; the girl, growing up into young ladyhood, is imprisoned within tight-fitting dresses, to exhibit the developing form ; she carries her hands folded across the chest ; she may not run, or speak loudly, or commit any unladylike impropriety, which might insure pulmonary expansion, notwithstanding epithelial desquamation is still most active. Can we wonder at the result ? Soon the shoulders are drawn forward, to cramp still more the chest ; the shallow respiration fails to reach the apex of the lung, and ere long, in this spot, a dullness on percussion tells us the epithelial debris has failed of being removed ; a tubercular deposit has taken place.

It may be thought that the epithelial origiu of yellow tubercle fails to explain why a so-called "cold on the lungs" leads to or develops a pulmonary deposit in those organs. The accompanying cough, we might presume, would so expand the air vesicles of the lungs, as to antagonize the tendency to tubercular accumulation. But, passing over the fact that at such times there is an increase of effete matters in the lungs, we observe that a cough does not presuppose any such inspiratory effort as will expand the air cells at the apex of the lung. No more air is drawn in than shall suffice, by its sudden expulsion, to eject from the trachæa, or larger bronchus, some irritating substance which may have been carried so far outward by the ciliary action of the smaller bronchi. The voluntary efforts of the patient, it will be observed, are all directed to prevent expansion of the lungs. Dreading even to draw the external air over the inflamed surfaces, he bends forward the spine, draws the shoulders forward, to hold the chest stationary, to arrest, as far as may be, all breath motiou ; thus assuming the very position which, by its continuance, is sure to prevent epithelial excretion, and thus to establish the tubercular deposit. Herein,—please notice this point,—is the real danger of 'colds,' in their relation to Phthisis ; and hence the urgent need of special cautioning and care, that, as soon as the inflammatory condition will permit, the fullest expansion of the lung shall be secured.

It has seemed necessary thus fully to develop this theory of the epithelial origin of yellow tubercle, because, as a man thinks so is he, and one, adopting this theory, is naturally led to those means which are found most certain to counteract the morbid deposit. The great rule impressed upon us is this : *Increase the depth and vigor of the respiratory act, and so insure the fullest expansion of every part of the lung.*

But preceding the deposition of tubercle, a state of general debility is usually observed, dependent, according to the common theory, upon

the assumed tubercular dyscrasia or impairment of the blood. According to the theory we adopt, the general feebleness of the system begets a like feebleness of respiration, whence results insufficient pulmonary excretion, with its consequent accumulation of tubercular or epithelial debris. This state of debility arises from inadequate nutrition, from protracted sickness, (and especially from the exanthemata,) from the mental depression of over-burdening grief or anxiety, and from other manifest causes. To meet it we have merely one thing to do. Bring up the general strength.

The prophylaxis, then, of Phthisis Pulmonalis, whether it has reference to the state of the lungs or of the system generally, resolves itself into one plain, simple rule. Raise the physical condition of the whole system to the highest vigor possible. Physical culture is the safeguard against Consumption.

But a preliminary question may arise as to the precise limit of the treatment we may style prophylactic. One calls that Phthisis, and rightly so, where, on careful examination, a slight deposit in the lungs is detected, although the rational signs are few. Another refrains from pronouncing the dreaded name, until the constitutional disturbance has so far progressed as to leave but faint hopes of recovery. But this disagreement, practically, is of little importance. It is virtually the same thing, whether we avert the possibility of a tubercular deposit, or, after its recurrence, prevent fresh deposit, and so assist the cure of that already there.

That Phthisis is curable, so far as any disease is curable, though some even in the profession still doubt it, no longer admits of a question. Not to cite reported cases, and the opinions of various standard authors, the experience of every physician at all expert in Auscultation and Percussion, furnishes numerous instances where tubercular deposit, of an inch or more below the clavicle, is found sensibly diminishing under appropriate treatment. And the revelations of the dead-house of any large hospital, are proof enough on this point. Autopsy after autopsy is made, as the writer can testify, of patients dying of disease other than pulmonary, whose lungs, scarred and puckered by lines radiating toward a central cicatrix, attest the healthy closure of large tuberculous cavities, to the number of two or even three. Why should we not expect such a result? The system will dispose of foreign bodies in other parts; here a like process of supuration is set up, with expectoration, to get rid of the softened tubercle, and if, during the debilitating process, the strength is sustained,

and the healthy portion of the lung kept expanded, so that no further deposit takes place, an entire cure, as a matter of course, will result.

Now for the practical application of the rule we have adopted for the Prophylaxis of Phthisis. *How* shall that completeness of physical vigor required to ward off tubercular consumption be best secured?

First, as regards the lungs themselves. These may be expanded and strengthened—*from within*, by the dilating force of the air drawn in by deep, forcible inspirations—*from without*, by the methodical development of the muscles concerned in respiration.

To take deep, forcible inspirations, although apparently a very simple thing, requires no little effort and practice to accomplish it to the best advantage. Most persons, especially those with a predisposition to Phthisis, when told to draw as long a breath as possible, will inhale with much outward display, then exhale; the whole a matter of a second or two, and that is actually the extent of their ability. They have not yet fully learnt how to breathe. But a vast improvement will be witnessed after a little training. Let the patient sit or stand with the shoulders carried back and downwards;—through an $\frac{1}{2}$ inch tube, or a similar orifice made with the lips, direct him to draw in his breath slowly and for as long as possible; when he thinks his lungs are full, let him make still further efforts, raising the ribs and catching for breath, as one in Asthma, until no more air can possibly be drawn in; then hold the breath for a moment or two, at the same time forcibly carrying the shoulders still further back and down,—after which the air is suffered gradually to pass out of the lungs. Any one watching the process in himself, will observe that the air, at first entering the lower and more moveable part of the lung, does not fill or expand the apex, till the last forcible inspiratory effort, and that it is especially pressed into that part by the drawing back of the shoulders at that time. This exercise is performed preferably in the open air, or if a warm room is required, it should be well supplied with oxygen. As the pure cool air enters deeply into the lung, a sense of warmth and refreshment is felt over the whole body. A few deep inspirations have often sufficed thoroughly to warm the writer, when riding out and suffering from the cold. A good degree of proficiency in the operation will be recognized, when sixty seconds shall be consumed in one uninterrupted inspiration. Of course, in case of actual deposit, the inspiratory effort should be graduated to the strength of the patient; and, in any case, the experimenter will hardly feel like trying it twice in immediate succession. The slowness with which the effort is performed is essential, giving all parts of the lung time to expand, and

accustoming the respiratory muscles to the varying positions required for the complete act of respiration.

In like manner, to expand the lung by means of its contained air, the spirometer of Dr. Dio Lewis proves of very great service. In this instrument, the air is blown into a very small elastic chamber, which, by its expansion, forces apart a spiral spring, whose movements are registered upon a dial. As the air cannot escape from the small chamber, the reaction upon the lungs is of course equal to the force with which it is blown in. A degree of the dial is stated to mark a pressure of an ounce to the square inch, and when the pressure is raised, as with gradual practice it safely may be to four or five lbs. to the inch, a power is exerted that will prevent the possibility of any air-vesicles remaining unexpanded, in which epithelial debris might find a lodgment.

This instrument is not a measure of the capacity of the lungs, like other spirometers, but of the power of the respiratory muscles, and its revelations strongly expose the prevalent faulty development of these all-important muscles. Many a delicate lady, through weakness of these muscles and ignorance of their use, is unable at first to move the index a single degree. One evening, a middle aged lady of pulmonary development equal to the average, was in the writer's office. Trying the spirometer, after two or three efforts, she succeeded in carrying the index as far as 8, much farther than most ladies in their first attempts. Her little son seized the tube; expanding fully his chest with a deep inspiration, showing that the daily exercise of his lungs in childhood's plays, had not been lost upon him, he quickly carried the index to 8, on his first trial, and to 12 on the second; a marked illustration of our previous statements regarding the greater relative development of the muscles of respiration in early than in adult life.

We are now prepared to recognize the necessity of the second means suggested for expanding the lungs, viz: by the methodical development of these respiratory muscles. If a special physical labor devolves upon an individual, by that very work he is compelled to develop the muscles especially brought into play, or he will soon be found incompetent. The youth in training for a rowing match, while strengthening his whole system, seeks especially to strengthen the muscles by which he pulls at the oar. So one struggling for long life, against a narrow, contracted chest, an enfeebled respiration and a hereditary tendency to Phthisis, should he not especially develop the muscles which antagonize these tendencies,—upon whose efficiency his very existence depends? Every time even, that the arm is raised above the

level of the shoulder, by its muscular attachments, it draws upon the ribs, raising them, and thus enlarging the cavity of the chest,—thus producing a larger vacuum and a freer entrance of air.

No one, surely, will fail to appreciate the value of such movements, methodically practiced from day to day, and varied, as required to bring the different muscles into action. The kind of movements required will suggest themselves to any good anatomist, and may be found, with much variety of detail, in the treatises of Dr. Dio Lewis, on the “New Gymnastics,” and on “Weak Lungs,” works well worthy a place in the physician’s library. The so called lighter gymnastics are preferable to the heavy exercises, especially for those of feeble strength, being based upon the principle that several repetitions of a slight exertion involve, in the end, an expenditure of muscular power equal to a greater effort put forth once or twice, while all risk of an injurious strain is thus avoided. “Putting up” a 36 lb. dumb-bell, no doubt, would be too great an effort for many, but all can raise a one pound bell. And repeating this thirty-six times, furnishes an equal or greater amount of exercise in a more available form, since the number of repetitions, and thus the amount of labor, may be adjusted to the strength of the patient. Such exercises as carry the shoulders back and downward, are especially recommended. And not alone at the hours of practice, but at all times, it should be the endeavor to preserve this healthful position of the shoulders, for which purpose well-developed muscles are certainly better adapted than anything artificial in the way of braces.

But our attention is not restricted to the upper extremities. The whole system is to be invigorated, and to this the due exercise of all parts is essential. He who announced to our first parents that law of mortal life, “In the sweat of thy face shalt thou eat bread,” bestowed a blessing in the curse itself,—in it revealing to them the condition upon which depends the perfection of physical health. Exercise sufficient to excite perspiration, is daily needful, if we would have the most robust health; and such general exercise, bringing the lungs into more vigorous action, greatly promotes their expansion and health. In addition to general gymnastic exercises, and the various out-door games, the following exercises are especially worthy of note:—walking, at the rate of at least three to four miles an hour, particularly with a companion;—riding on horseback, a gentler form of exercise which, the body being supported, may be prolonged much beyond the preceding, with the advantage of fully engaging the mind between the care of the horse and the rapidly passing scenes;—rowing, the body again

supported with alternating action and rest of the muscles,—and lastly, hunting, for one fond of the sport, who, with gun on shoulder and a fair prospect of game, will endure an amount of exercise to which, without these accompaniments, he would be entirely unequal. That these forms of exercise require the open air, is a special recommendation.

Can it be necessary here to urge the value, the absolute need of pure, fresh *air*? How strangely is this point overlooked by the community in general, and even by many physicians. The experience gained by our soldiers in this matter during the past war, if the coming generation will but profit by the lesson, we might almost say is well worth the cost, putting the lives lost against lives to be gained. With our tightly ceiled houses, our closed fire-places, our horror of drafts, leading us to shut off every avenue of the ventilation essential to health, we were indeed rapidly becoming an enervated race, unfitted to occupy the places once filled by our sturdy forefathers.

To derive the full benefit of fresh air, it is scarcely necessary to premise that it must be made free use of. Much is said, and justly, of the pure, bracing air of Minnesota. Yet those who go there to shut themselves up in the hotels or boarding-houses, gain little more than they would at home. An instructive case came under the writer's observation there, during the summer of '62. A lady in feeble health, with a tubercular deposit and accompanying cough, came to try the effect of the climate. Having improved but little after a month's stay, she joined a camping party of ladies and gentlemen, and with an open two-horse wagon and tent for the night, they started out. The third day, toward dusk, they lost their way, and it was after nine o'clock in the evening, ere water was reached, where they might encamp. Notwithstanding this prolonged exposure to the falling dew, in an open wagon, this lady took no cold, while a similar exposure, a few days before, had produced a serious aggravation of her symptoms. This diminished susceptibility to taking cold was, unquestionably, due to the uninterrupted exposure to the open air for the three days previous. A continuance of the same out-door life, so strengthened the constitution of this invalid, that in two months thereafter she was sleeping with impunity with the air blowing freely across her, from a window on one side of the bed's head to another at the foot. A similar experience of life in the open air has been repeated in numberless instances among the young men of our army; delicate young men going out to camp life against the remonstrance of friends and advice of physician, have returned in improved physical development, notwithstanding untoward circumstances of fare and fatigue, with the same story,—“they could not take cold in camp.”

Let then those dreading consumption, as well as those attacked, give to the pure fresh air every facility to invigorate their constitutions. Let them be out of doors, to breathe it, of course with sufficient clothing, whether the weather be fair or inclement; let them admit the air freely into their living rooms, and especially into their sleeping apartments. One-third, or thereabouts, of our lives we spend in bed do we consider what our physical frame must lose in being deprived of pure air for so great a portion of our lives? Would you admit a draft? Yes; as soon as the system has gradually become habituated to it, let the air blow in freely, without let or hindrance, if not across and through the room, at least from one side. Little do those sleeping in close confined bed-rooms suspect the refreshment and invigoration of a night's rest, with the pure cool air passing freely over the sleepers' face; and still less, having once enjoyed it, would they return to their former habit. I speak from experience.

The direct effect, upon the respiratory action, of breathing an impure atmosphere, may be most readily observed, if from active exercise in the open air, one takes up with a sitting position in a close crowded room. At first there is a painful oppression for breath; after a time, the elasticity of spirits felt out of door is replaced by dullness and more or less drowsiness, while the respiration, before so deep and free, becomes shorter, shallower, and entirely abdominal,—the lower portion of the lungs alone participating in the respiratory movement. The usual desire for breath even is greatly diminished, and an evident effort of the will is required to overcome a certain repugnance to a deep inspiration, as if the lungs refused to receive what fails to answer their purpose. We observe, then, that continued confinement in impure air, not alone by lowering the vital powers of the system, and so indirectly, but also by a direct action, reduces the extent of the breath motion,—thus taking away that great safeguard against tubercular deposit. The well-known predisposition to Phthisis in the negro, when migrating to colder climates, as from South to Canada, is doubtless largely due to the fact, that, dreading the severe cold of winter, the blacks are huddled together in the impure air of confined rooms, instead of strengthening their lungs by exposure to the keen, but bracing, atmosphere of those northern climes.

In a report of the sanitary statistics of Massachusetts, during the years 1845 to '48, a suggestive fact is noted. "The number of females perishing from Consumption between the ages of 20 and 30, is nearly double that of the males. In the country towns, the proportion of the two sexes is 39.01 males to 60.99 females, while in New York

City it is 42.03 to 57.92. What are the peculiar causes affecting females in the country, predisposing them to this disease?" is a question asked by the reporter, and answered easily enough. In the country, the males generally are out of doors throughout the day, and their exercise is of a nature to develop the muscles of the chest, while the females are as constantly indoors, and engaged in labors which give the least play to those muscles,—but the same difference in the out and indoor occupations of the two sexes does not hold good of a large city like New York. Do not these facts throw much light upon the value of exercise and air in the treatment of our consumptive patients?

In his Medical Inquiries, published in 1789, Dr. Rush tells us that "the radical remedy for Consumption is long continued horse-hack exercise;" but to derive the full benefit from this advice, as another well expresses it, "the patient should be a Tartar, and *live* on his horse." This admirable prescription may not be feasible in all cases, yet all successful treatment must carry out the principle upon which it is based,—that *air and exercise* conjoined are *essential* to the cure of Consumption.

Let me here cite an instructive case, bearing on this point. In Dec., 1858, for hemorrhage from the lungs, the writer was called in to see an Englishman, twenty-eight years of age, of large frame, yet quite thin and stooping. Under one clavicle was a tubercular deposit of two inches or more, which, in connection with the general prostration of his system, led me, notwithstanding my general hopeful views of Phthisis, to feel that the case was a very doubtful one. However, he improved much, and so continued, though unable to return to his trade, that of a horse-shoer, till the early part of February, when, fearing the spring months in New Haven, by my advice he went to visit a brother, most fortunately for him located in the mountain region of Penn., near where the Susquehanna crosses the New York Line, taking with him one special direction, "to be out of doors all he could." The last of May he returned, one would scarcely believe the same person, walking erect, shoulders well back, of good flesh and color,—the dullness under clavicle evidently diminishing. His story was, that at first he could walk out but little, though often, each day. As he gained strength, he tried working with his brother at chopping wood, and now, for some weeks past, he had been swinging the axe regularly from morning to night. The Horse-shoer's Union, of N. Y. City, of which he was a member, and with which he had filed an application for the weekly allowance given to sick members, on his

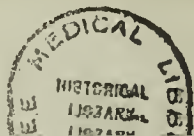
claiming in person his back dues when he returned, declined paying them, without an unusual amount of documentary evidence,—the officers of the Society not crediting his statement of having had Consumption. His health continued to improve until, on his removal from New Haven, he was lost sight of. To exercise with the axe, in the pure mountain air, we must believe he owed his recovery. It must not be overlooked, that in the outdoor air we obtain the fullest exposure to the vivifying influence of sunlight, deprived of which, animal as well as vegetable organisms become blanched and sickly.

From what has been already stated it will readily be seen, that of the various occupations and trades, such as are practiced in the open air, and particularly if they require exercise of the upper extremities, are most desirable for those with pulmonary tendencies, while the most pernicious of all, are those indoor occupations, in the prosecution of which a fine dust is inhaled into the lungs, to be added to the epithelial debris perhaps already accumulating there. It is hardly necessary to remark, that those engaged in such occupations should take every means, whether at or off work, to secure a free supply of pure air, and the utmost possible development of the respiratory apparatus.

In this inquiry into the methods of raising the physical frame to its highest vigor, the question of *diet* comes in for a prominent share of attention. And the more so, as the habits of our people are much at fault in this respect. In both the quantity and the quality of our food, I am persuaded that, with few exceptions, we daily overtax our digestive organs. As a consequence, in time they become weakened, gradually losing the ability to elaborate a due supply of nutriment to replace the daily wear of the system in health, and are found to be yet more wanting when most needed,—when the inroads of disease have weakened all the bodily powers. Of especial importance is this matter to one dreading the attacks of tubercular disease, for in the majority of cases, the condition of the digestive apparatus decides the question whether pulmonary deposit shall go on to the destruction of lung and life, or the powers of the system shall avail to clear away the obstruction and effect a return to health.

It certainly seems as if the training Americans receive from youth up in the management of the appetite, were designed to ruin the digestive powers, and to bring on a premature old age. Nothing is denied our youth that the tougher stomach of the adult can dispose of, and this, not alone at meal time. Between the meals, at unreasonable hours, through mistaken kindness, or to quiet the appetite heretofore thus fostered, pastry, cake, and the like, are even forced

upon the child, who, at the next succeeding meal, must either refuse to partake, thus breaking up all regularity of eating, or tempted by the rich food, and because others are eating, he stuffs himself, until at last the overloaded stomach refuses to work longer, and a fit of indigestion yields it a constrained rest. Nor is the temporary inconvenience the only one. The habit is formed of eating beyond and without the appetite, beyond the need, and so, after years of similar self-indulgence, the failure of the overtaken stomach to elaborate sufficient nutriment is manifested in a softened brain, or in the degeneration of some other important organ.—Where is the remedy for all this? In one or two simple rules. We must learn to eat no more than is absolutely required for the wants of the body, or as it is well expressed, “to rise from the table with an appetite;” and secondly, we must shun as poison all indigestible articles of food. How in the name of common sense could anything so difficult of digestion as pie-crust ever have come into such general use among us? Economical perhaps it may be for the house-keeper, but sadly extravagant for the poor eater’s stomach! The flour, as albumen, requires digestion in the stomach by the gastric juice; the fat is digested in the duodenum by the pancreatic juice; a different destination for each component part, and yet, by the agency of heat, each atom of flour has been bound up in almost a chemical compound with its atom of fat. Can aught but the most powerful efforts of the stomach untie the knot? And what shall we say of newly baked bread, with the yeast plant not destroyed by a sufficient continuance of the oven’s heat? Compacted into tough masses in the stomach, it is long ere the gastric juice, which if strong enough might yet kill the yeast, can penetrate to the center, and so the yeast, sprouting and growing in the warmth and moisture, soon transmits the doughy material into a mass of fermentation, to be disposed of, how?—the poor struggling yet faithful stomach alone can tell the tale. Whose stomach can long stand such hard usage and not fail at last? No wonder the nervous, pale faces we see about us, martyrs to dyspepsia, self-immolated. To enumerate all the ‘indigestibles’ in common use is not necessary. The judgment of man, though not his practice, may be trusted on this point. One evil however, requiring a passing notice, is the inordinate use of fluids, especially of cold water. The injurious effect of this practice in diluting the gastric juice, and thinning the blood, may be witnessed in the anemia and nervous prostration of those addicted to it. No doubt the habit is often formed in childhood, by an uneasy desire for something passing over the palate, perhaps from the congested condi-



tion of the over-worked stomach, or it may arise from our custom, at the outset of a meal, of supplying some warm sweetened drink, as tea or coffee, to be drank not merely to quench thirst, but as a regular part of the entertainment.

But let us not by any means underrate the vital importance of a sufficiency of hearty, wholesome food, or of fatty articles of diet. In our land of plenty, but two classes in good circumstances are likely to suffer in this respect,—infants, about the time of weaning and onward, who giving up their animal food, the mother's milk, are often restricted in the use of fats and animal food, and those tending towards Phthisis, who voluntarily restrict themselves. The latter class, indeed, might almost be pointed out by their uniform rejection of fats. It is very desirable that such be habituated, freely, to partake of butter, cream, milk, and fat meats, (if the stomach can be trained to receive the latter). I would never press the eating of fat meat; other forms of fat may be substituted for it; and experience has convinced me that the difficulty with which in the stomach the gastric juice reaches through to the albuminous envelope of the inner oil globules, ere they can be set free to pass on into the duodenum, renders the digestion of fat meat so slow a process as to tease the stomach, often causing it entirely to reject the offending substance.

Our civilized way of baking bread is most unfortunate, as regards the weak digestive powers of those tending to Phthisis. In the effort to secure white, fine-looking bread, the bolting sifts out from the flour the greater part of the Cerealins, nature's digestive ferment, and then comes in the yeast fermentation, to destroy the little that is left. It is to be hoped that some method may be discovered of making nutritious and palatable bread, without yeast, like the Areated Bread, so-called, (made by forcing fixed air into the dough by machinery,) which at the same time, shall be practicable for household manufacture. In the mean time, we may have recourse to the various combinations of wheaten, unbolted or Graham Flour, made without yeast, and to the solid wheat or oaten grain, which, cracked and thoroughly cooked, is exceedingly digestible, nutritious, and admirably adapted to children's use.

Another point of great hygienic importance is, a due attention to the condition of the *skin*. A glandular apparatus covering the whole body, with an average daily perspiration nearly two pounds of fluid, from two miles and a half of secreting tubules, and exposed to ever-varying alternations of temperature, must exert a powerful influence upon the health of every part of the system. Indeed, it has

even been suggested, that the clogging of the cutaneous secretion, from continued neglect of cleanliness, or the like, often prove an indirect cause of Phthisis, by throwing an increased burden upon the lungs. We well know that the sudden checking of the secretions of the former is very likely to be followed by congestion and inflammation of the mucous membrane of the latter.

The best means of fortifying the system against these sudden attacks of cold, is of much consequence to one fearing Consumption. Life in the open air has already been commended in this connection, but such radical treatment is within the reach of very few; yet there is a means of protection against these atmospheric changes, accessible to all, which is sure and simple. The cold sponge bath faithfully used each morning, may be relied upon to afford the system this desired immunity against ordinary colds. No elaborate or costly apparatus is required; a bathing mat, or preferably, a bathing-pan, with flaring sides, a large stout sponge, coarse towels and a bowl of water, are all that is needed. What is of more difficult supply, is the moral courage required to rise from a warm bed on a winter morning, to encounter the shock of the cold water. The reaction following the first shock of the cold water, sends the blood with greater vigor through the capillary circulation of every part, giving renewed life to every function. Especially is this true of the skin, which, in addition, is cleansed of the exuvie of daily perspiration, and at the same time, by its exposure to so great a change of temperature as that of the bath, is hardened to resist the lesser exposures which are of daily occurrence. Of course, to derive any benefit from the bath, it is essential that full reaction should follow it. This is promoted by seeing that the skin is warm and the body not fatigued before the bath; by the suddenness and short duration of the application of cold water, and by vigorous friction afterward. For a feeble person, it is desirable that the air of the room be quite warm. It may be well to increase the activity of the capillary circulation by dry friction, with rough towels or hair mittens, for some mornings previous to the first trial of the bath. If for sufficient reasons one is unable to bathe the whole person, immersing the feet on a morning in cold water, with subsequent thorough friction, will be of great service in preventing the coldness of the extremities, so apt to result in taking cold.

The protection to the skin against atmospheric changes which the *dress* affords, is a matter bearing strongly upon the health of the lungs, and of late rather more than formerly, has been regulated by

the dictates of common sense. The value of woolen clothing next the skin, of warm, thick coverings for the extremities, especially the feet, is becoming more generally appreciated and adopted. Yet there are still to be found those of more vanity than discretion, enough to furnish quite a crop of Consumptives for some time to come.

Since we attribute so much importance to exercise, it follows that the dress should be so constructed as to afford full play to all the muscles. A lady's dress, with the shoulder seam some two or three inches down the arm, presents no little obstacle to raising the elbow even to the level of the shoulder,—especially when a tight-fitting waist farther imprisons the respiratory muscles. The other sex are more fortunate in the fashion of their dress, yet caution is needed that the upper garments do not bind or button tightly across the front of the chest.

Many other minor points, bearing upon the question of physical vigor we have not space to notice. Excesses of any kind, late hours of retiring and rising, the abuse of alcoholic liquors, or the use of tobacco, should be shunned by all who have reason to apprehend pulmonary deposit.

We have before us, then, the following means by which to insure the health of the lungs and the body in general. First, bearing upon the lungs directly,—deep methodical inspirations, and the special development of the respiratory muscles; secondly, upon the lungs and the whole system conjointly,—active muscular exercise, the free use of fresh air, a diet nutritious and digestible, and suitable care and protection of the skin.

Who will not acknowledge that if these suggestions were faithfully carried out by any one in health, that for him Phthisis is well nigh an impossibility? For my own part, I could almost guarantee exemption from the disease to any one who will, six times in the course of each day, and in the open air, thoroughly inflate the lungs in the manner before described. Even in a most unfavorable case, where overburdening care or grief is pressing down the spirits, impairing the digestion and every vital process, if the requisite pains be taken to keep the lungs expanded, may we not feel assured that these organs, at least, will be able to stand the pressure. If this is so, is there any reason why one person among the thousands of our State now in health, if he may be made acquainted with the principles herein set forth, and no physical or mental defect interpose,—is there one such who from that time need fall a victim to Chronic Phthisis? It may require a little patience and perseverance, and the summoning up of all one's energies

but it may be done; aye, even when the torpor of the deceptive disease, like the death sleep of the snow-henumbed traveler, is already settling down upon him,—if he will but go resolutely forward to what is for him, for the time, the business of his life,—there is hope for him yet.

But some one may ask, is not Phthisis a hereditary disease, transmitted from father to child, and will not those be ever found, whom, even from their birth the disease has marked for its own? The disease itself is never transmitted, though the tendency to it, in the physical formation or mental temperament of the offspring, may be; yet this tendency has, doubtless, been greatly overestimated. Dr. Walshe draws the following conclusion from an analysis into the family history of 446, that “Phthisis, in the adult hospital population of this country, [Great Britain,] is, to a slight amount only, a disease demonstrably derived from parents.” And other observers corroborate this opinion. Chronic Phthisis is a disease acquired by education and training, rather than inherited. The wild beast in the menagerie, whose parents still roam their native wilds, dies often of Phthisis, developed by its new, unnatural life.

But however strong be these hereditary tendencies, how thoroughly they may be eradicated, will readily be seen from the facts already considered. To do this,—to attend to the physical education of the child, is a duty, sadly neglected, to be sure; yet as surely a duty as to provide education for the mind. For of what avail, for this world, is learning without health, or knowledge without the ability to use it? Still more is the obligation imperative upon those parents, in whose families tendencies to Phthisis have manifested themselves, to take every means to secure the most robust health for their children, from infancy up. Yes, upon every parent or guardian devolves the imperative duty of seeing that the child, from its infancy, is properly protected with warm clothing; is allowed an abundance of pure air and sun-light; that its living and sleeping apartments, the nursery and the school-room, be well ventilated; that bathing be made an essential feature of family arrangements; that the diet be plain, varied, and nutritious, and that proper habits of self-control in eating be acquired; and that exercise sufficient to the healthful development of all the muscles, be methodically practiced. Upon a due attention to these matters, not only the health, but the happiness and the future usefulness of the child depends.

Before the years of self-dependence, the responsibility in these matters must rest upon the parent or guardian; the duty of discharging

this obligation is inherent in the family relation ; it may not be evaded, for it is laid upon each parent by the Great Parent of all. Nay, even back of all this, parents themselves owe it to the offspring which may yet be given them, to use their mature judgments in invigorating their own health, especially in strengthening the organs of nutrition, upon whose perfect development and preservation so greatly depend the future constitutions of their posterity. When this shall be done ; when the parents of the present and coming generation shall fully recognize and discharge their duty to their offspring ; when each individual, for himself, shall understand and obey the laws of health ; then may we confidently expect that, in its chronic form, this disease, now so dreaded, the scourge of our present civilization, will be but a thing of the past.

For ourselves, as physicians, as conservators of the public health, it is our special duty, in our practice and by our teachings, to enforce upon the community the great truth, that *the full development of every part of the system, in other words, the most complete physical training, is the only, and yet the sure, safeguard against the common form of Consumption.*





